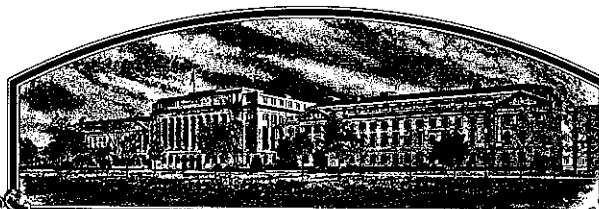


No.



8800149

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**United AgriSeeds, Inc.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY; AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'NS501'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 28th day of April in the year of our Lord one thousand nine hundred and eighty-nine.

Attest:

*Kenneth A. Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Clayton Yeutter*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055


## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| 1. NAME OF APPLICANT(S)<br>United AgriSeeds, Inc.  |  | 2. TEMPORARY DESIGNATION<br>A634 x K1 - 172B |  | 3. VARIETY NAME<br>NS501   |  |
| 4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code)<br>103 Tomaras Ave<br>Savoy, IL 61874   |  | 5. PHONE (Include area code)<br>217-373-3500 |  | FOR OFFICIAL USE ONLY<br>VPPO NUMBER<br>8800149  |  |
| 6. GENUS AND SPECIES NAME<br>Zea Maize   |  | 7. FAMILY NAME (Botanical)<br>Gramineae      |  | FILING<br>DATE May 13 1988<br>TIME 1:30 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M. |  |
| 8. KIND NAME<br>Corn, Dent   |  | 9. DATE OF DETERMINATION<br>5-1-87           |  | AMOUNT FOR FILING<br>\$ 1800 <sup>00</sup><br>DATE May 13 1988   |  |
| 10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)<br>Corporation   |  |  |  | AMOUNT FOR CERTIFICATE<br>\$ 200 <sup>00</sup><br>DATE Mar. 6 1989   |  |
| 11. IF INCORPORATED, GIVE STATE OF INCORPORATION<br>Massachusetts  |  |  |  | 12. DATE OF INCORPORATION<br>8-28-81   |  |
| 13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS<br>United AgriSeeds, Inc.<br>Mike McFatrish - P.O. Box 4011<br>Champaign, IL 61820<br>PHONE (Include area code): 217-373-5300 |  |  |  |  |  |

|  |  |
|--|--|
| 14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED  |  |
| a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)   |  |
| b. <input type="checkbox"/> Exhibit B, Novelty Statement.  |  |
| c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)  |  |
| d. <input type="checkbox"/> Exhibit D, Additional Description of Variety.  |  |
| e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.   |  |
| 15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No   |  |
| 16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  | 17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> Foundation <input type="checkbox"/> Registered <input type="checkbox"/> Certified |
| 18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No  |  |
| 19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No   |  |
| 20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.<br>The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.<br>Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties. |  |

|   |                |
|---|----------------|
| SIGNATURE OF APPLICANT<br> | DATE<br>5-6-88 |
| SIGNATURE OF APPLICANT  | DATE           |

Dent Corn  
NS501

14A - Exhibit A - Breeding History

Pedigree: A634 x K1

"NS501" is a selection from the cross A634 x K1 which was selfed for 8 generations. Each generation was ear rowed on the basis of appearance and uniformity. Early generation testing was employed to determine combining ability and yield performance in hybrid combination.

"NS501" appears stable and uniform and has entered hybrid seed production as a seed parent. "NS501" was used in combination with W117, (NS501 x W117) to produce the hybrid 2270. This hybrid was produced in 1987 and sold to farmers for the first time in October of 1987 for planting in 1988.

Dent Corn  
NS501

14A - Addendum to Exhibit A - Breeding History

"NS501" has been evaluated in four (4) different environments and for three (3) generations. These evaluations established an off type plant which in one of the four environments was slightly taller (16 cm.) than NS501. The plant is 229 cm. versus 213 cm. for NS501 and occurs with a frequency of 3%.

"NS501" was used in the summer of 1988 as a female to produce a commercial hybrid. The hybrid seed will be made commercially available for 1989 planting.

Dent Corn  
NS501

14B - Exhibit B - Statement of Novelty

"NS501" is most similar to A634 but is four (4) days earlier than A634. "NS501" differs from A634 by having one (1) less leaf above the ear and by having an ear height 8 cm. shorter on average than A634. Additionally, "NS501" has on average seven (7) more tassel branches than A634. The shank length of A634 is 7 cm. shorter than "NS501" and A634 has on average two (2) less shank internodes than "NS501". A634 does not provide more than one (1) ear while "NS501" does have a strong tendency to provide two (2) ears.

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
GRAIN DIVISION  
HYATTSVILLE, MARYLAND 20782  
OBJECTIVE DESCRIPTION OF VARIETY  
CORN (ZEA MAYS)

NAME OF APPLICANT(S)

United AgriSeeds, Inc.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

103 Tomaras Ave.  
Savoy, IL 61874

FOR OFFICIAL USE ONLY

PVPO NUMBER

8800149

VARIETY NAME OR TEMPORARY  
DESIGNATION

NS501

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (e.g.,  or ) when number is either 99 or less or 9 or less.

## 1. TYPE:

1 = SWEET

2 = DENT

3 = FLINT

4 = FLOUR

5 = POP

6 = ORNAMENTAL

## 2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

1 = NORTHWEST

2 = NORTHCENTRAL

3 = NORTHEAST

4 = SOUTHEAST

5 = SOUTHCENTRAL

6 = SOUTHWEST

7 = MOST REGIONS

## 3. MATURITY (In Region of Best Adaptability):

DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK

(Under "Comments" (pg. 3) state how  
heat units were calculated)

HEAT UNITS

DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY

HEAT UNITS

DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE

HEAT UNITS

## 4. PLANT:

CM. HEIGHT (To tassel tip)

CM. EAR HEIGHT (To base of top ear)

CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

1 = NONE

2 = 1-2

3 = 2-3

4 = &gt; 3

Number of Ears Per Stalk:

1 = SINGLE

2 = SLIGHT TWO-EAR TENDENCY

3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

1 = NORMAL

2 = "T"

3 = "S"

4 = "C"

5 = OTHER (Specify)

## 5. LEAF (Field Corn Inbred Examples Given):

Color:

1 = LIGHT GREEN (HY)

2 = MEDIUM GREEN (WF9)

3 = DARK GREEN (B14)

4 = VERY DARK GREEN (K16)

Angle from Stalk (Upper half):

1 = &lt; 30°

2 = 30-60°

3 = &gt; 60°

Sheath Pubescence:

1 = LIGHT (W22)

2 = MEDIUM (WF9)

3 = HEAVY (OH26)

Marginal Waves:

1 = NONE (HY)

2 = FEW (WF9)

3 = MANY (OH7L)

Longitudinal Creases:

1 = ABSENT (OH51)

2 = FEW (OH56A)

3 = MANY (PA11)

Width:

CM. WIDEST POINT OF EAR NODE LEAF

Length:

CM. EAR NODE LEAF

NUMBER OF LEAVES PER MATURE PLANT

5

# 6. TASSEL:

1 6

NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

3

1 = < 30°

2 = 30-40°

3 = > 45°

Peduncle Length:

0 5

CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

2

1 = LIGHT (WF9)

2 = MEDIUM

3 = HEAVY (KY21)

3

Anther Color:

1 = YELLOW

2 = PINK

3 = RED

4 = PURPLE

5 = GREEN

4

Glume Color:

6 = OTHER (Specify)

Pollen Restoration for Cytoplasm (0 = Not Tested, 1 = Partial, 2 = Good)

0

0

0

0

OTHER (Specify Cytoplasm and degrees of restoration)

# 7. EAR (Husked Ear Data Except When Stated Otherwise):

1 6

CM LENGTH

4 0

MM. MID-POINT  
DIAMETER

8 7

GM. WEIGHT

Kernel Rows:

1

1 = INDISTINCT

2 = DISTINCT

1 2

NUMBER

1

1 = STRAIGHT

2 = SLIGHTLY CURVED

3 = SPIRAL

Silk Color (Exposed at Silking Stage):

1

1 = GREEN

2 = PINK

3 = SALMON

4 = RED

Husk Color:

1

FRESH

1 = LIGHT GREEN

2 = DARK GREEN

3 = PINK

1

DRY

4 = RED

5 = PURPLE

6 = BUFF

Husk Extension: (Harvest Stage)

1

1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear)

3 = LONG (8-10CM Beyond Ear Tip)

4 = VERY LONG (> 10 CM)

Husk Leaf:

1

1 = SHORT (< 8 CM)

2 = MEDIUM (8-15 CM)

3 = LONG (> 15 CM)

Shank:

1 5

CM LONG

6

NO. OF INTERNODES

Position at Dry Husk Stage:

1

1 = UPRIGHT

2 = HORIZONTAL

3 = PENDENT

Taper:

1

1 = SLIGHT

2 = AVERAGE

3 = EXTREME

Drying Time (Unhusked Ear):

2

1 = SLOW

2 = AVERAGE

3 = FAST

# 8. KERNEL (Dried):

Size (From Ear Mid-Point):

1 2

MM LONG

0 9

MM. WIDE

0 4

MM. THICK

Shape Grade (% Rounds)

2

1 = < 20

2 = 20-40

3 = 40-60

4 = 60-80

5 = > 80

6

8. KERNEL (Dried):

Pericarp Color: 1 = COLORLESS 2 = RED-WHITE 3 = TAN 4 = BRONZE  
5 = BROWN 6 = LIGHT RED 7 = CHERRY RED  
8 = VARIEGATED (Describe) \_\_\_\_\_

Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) \_\_\_\_\_

1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED  
7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) \_\_\_\_\_

Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:  
 1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH  
5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) \_\_\_\_\_

GM. WEIGHT /100 SEEDS (Unsize Sample)

9. COB:

MM. DIAMETER AT MID-POINT

Strength:  1 = WEAK 2 = STRONG

Color:  1 = WHITE 2 = PINK 3 = RED 4 = BROWN  
5 = VARIEGATED 6 = OTHER (Specify) \_\_\_\_\_

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

|                      |                       |                      |                      |                      |                        |
|----------------------|-----------------------|----------------------|----------------------|----------------------|------------------------|
| <input type="text"/> | STALK ROT (Diplodia)  | <input type="text"/> | STALK ROT (Fusarium) | <input type="text"/> | STALK ROT (Gibberella) |
| <input type="text"/> | NORTHERN LEAF BLIGHT  | <input type="text"/> | SOUTHERN LEAF BLIGHT | <input type="text"/> | SMUT                   |
| <input type="text"/> | SOUTHERN RUST         | <input type="text"/> | CORN SMUT            | <input type="text"/> | BACTERIAL WILT         |
| <input type="text"/> | BACTERIAL LEAF BLIGHT | <input type="text"/> | MAIZE DWARF MOSAIC   | <input type="text"/> | STUNT                  |
| <input type="text"/> | OTHER (Specify) _____ |                      |                      |                      |                        |

11. INSECT RESISTANT (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

|                      |                     |                      |                       |                      |           |                      |       |
|----------------------|---------------------|----------------------|-----------------------|----------------------|-----------|----------------------|-------|
| <input type="text"/> | CORNBORER           | <input type="text"/> | EARWORM               | <input type="text"/> | SAPBEETLE | <input type="text"/> | APHID |
| <input type="text"/> | ROOTWORM (Northern) | <input type="text"/> | ROOTWORM (Western)    |                      |           |                      |       |
| <input type="text"/> | ROOTWORM (Southern) | <input type="text"/> | OTHER (Specify) _____ |                      |           |                      |       |

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

| CHARACTER  | VARIETY | CHARACTER        | VARIETY |
|------------|---------|------------------|---------|
| Maturity   | A634    | Kernel Type      |         |
| Plant Type |         | Quality (Edible) |         |
| Ear Type   |         | Usage            |         |

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.  
Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous (Authors)  
Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize. Cornell A.E.S., Mem. 180. 1935.  
The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.  
Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.  
Butler, D.R. 1954 - A System for the Classification of Corn Inbred Lines - PhD. Thesis, Ohio State University.

COMMENTS:

7



Dent Corn  
NS501

14E - Exhibit E - Statement of the Basis of the Applicant's  
Ownership

The variety "NS501", for which Plant Variety Protection is being sought, was developed by Tom Mack who is an employee of Keltgen Seed of Olivia, Minnesota. Keltgen Seed is a company, wholly owned by United AgriSeeds, Inc. of Savoy/Champaign, Illinois.

Additionally, by signing an invention and non-disclosure agreement with United AgriSeeds, Inc., Tom Mack assigns all rights to plant material discovered, invented or developed by him to United AgriSeeds and retains no right to any material generated.

**This Assignment 990 is in the ENGLISH language and has the same meaning in other languages with the same 990 number.**

[illegible]

This Assignment 990 is in the ENGLISH language and has the same meaning in other languages with the same 990 number.

8800149

## ASSIGNMENT

**(TRANSFER)**

We, **ASSIGNOR:** UNITED AGRISEEDS, INC.  
of: 103 Tomaras  
Savoy, Illinois 61874  
United States of America

a company organized and existing under the laws of the State of Delaware, United States of America, do hereby claim and declare that we are the recorded owner of the following Patent Application(s) or Letters Patent(s) and other rights and powers obtainable or exercisable in respect thereof as numbered in U.S. Plant Variety Protection Certificate 8800149 issued on April 28, 1989.

We do hereby, for good and valuable consideration received, sell, assign and transfer unto:

**ASSIGNEE:** DowElanco  
of: 9002 Purdue Road  
Indianapolis, Indiana 46268  
United States of America

a general partnership organized and existing under the laws of the state of Indiana, our entire right, title and interest in and to the said Patent Application(s) or Letters Patent(s), and consent the recordal of this Assignment.

## ASSIGNOR

Subscribed and Sworn by us:

At Midland, Michigan 48640 USA

this 23<sup>rd</sup> day of October 1990

**ASSIGNEE**

Accepted by us:

At Midland, Michigan 48640 USA

this 23<sup>rd</sup> day of October 19 90

UNITED AGRISEEDS, INC.

By Ronald G. Brookens  
Ronald G. Brookens  
Assistant Secretary

CORP.  
SEAL

**SIGNATURE**

DowElanco

By Ronald G. Brookens  
Ronald G. Brookens  
Assistant Secretary

CORP.  
SEAL

8800 149

**TRUE COPY**

TO ALL TO WHOM THESE PRESENTS SHALL COME,

I Do Hereby Certify that the annexed document(s) are TRUE COPIES of the original document(s) which I have compared.

at Midland, Michigan 48640, United States of Americathis 24<sup>th</sup> day of October 19 90Print or Type Name  
of Person SigningLori J. Upleger  
Lori J. Upleger**NOTARIAL CERTIFICATE**UNITED STATES OF AMERICA )  
STATE OF MICHIGAN ) SS  
County/Parish of Midland )On this 24 day of October 1990, personally appeared  
before me,

Lori J. Upleger

known or identified to me to be the individual who executed the foregoing document and  
acknowledged the same as a free act and deed for uses and purposes therein expressed.

SEAL

Deborah C. Dulude  
Notary PublicNotary Signature  
Print or Type Name  
of Notary, Expiration  
Date, if any, Title or  
Jurisdiction AreaDEBORAH C. DULUDE  
Notary Public, Midland County, Michigan  
My Commission Expires June 14, 1994

[illegible]

This Notarial Certificate 220 is in the ENGLISH language and has the same meaning in other languages with the same 220 number.

8800149

UNITED STATES OF AMERICA )  
STATE OF MICHIGAN ) SS  
County/Parish of Midland )

On this 22 day of October 1990, personally appeared before me, Ronald G. Brookens, Assistant Secretary, DowElanco

known or identified to me to be the individual described in and who executed the foregoing document and acknowledged the same as a free act and deed for uses and purposes therein expressed.

Deborah Wexler  
Notary Public

DEBORAH C. DULUDE  
Notary Public, Midland County, Michigan  
My Commission Expires June 14, 1994